

NETZERO ENERGY OVERVIEW

HEADS UP! The NETZERO Energy Ball is in Play!

NETZERO IS THE CHALLENGE

NETZERO Energy means that a building balances its energy needs with energy produced from renewable, zero-emission sources.

While **NETZERO** Energy buildings may seem cutting edge, they will become status quo faster than you think! Federal buildings must reduce fossil-fuel-generated energy consumption to zero by 2030.

THE NETZERO DIFFERENCE

NETZERO Energy is different from prior energy efficiency approaches in two ways:

- The baseline and target are “zero” (instead of a percentage improvement over prior performance).
- The energy you use must be supplied from renewable energy sources (e.g., solar, wind).

GETTING TO NETZERO

Improve Energy Efficiency

Drive your energy use down. Then drive it down further! Reducing your energy needs is less expensive than providing renewable energy.

Learn About Renewable Energy

Identify options for emission-free energy sources.

Invest Wisely

Consider how procurement and investments impact the **NETZERO** Energy goal.

Prepare and Implement a Basic Action Plan

NETZERO is a target today but will be a requirement tomorrow.



NETZERO Energy Buildings In Operation

- NREL Research Support Facility, Golden, CO (shown left)
- Phipps Center for Sustainable Landscapes, Pittsburgh, PA
- Walgreens Store, Evanston, IL

NETZERO ENERGY TARGET SETTERS

Federal

- Energy Independence and Security Act of 2007, Section 433(a)
- Executive Order 13514, Section 2(g)(i)

State and Local

- California - Public Utilities Commission
- Massachusetts - Executive Office of Energy and the Environment
- Washington - Seattle 2030 District

Industry

- American Institute of Architects 2030 Commitment
- ASHRAE Vision 2020
- Living Building Challenge: **NETZERO** Energy Building Certification



Basic Action Plan

1. Assess Your Performance

- Understand how your building uses energy.
- Identify current requirements. What are the needs for building operations? For occupant activities? The more detail you can provide, the better. Describe energy needs by type, floor, activity, time of day, etc.
- Evaluate your efficiency. How well (efficiently) do you meet the needs? Not every building has separate meters for different spaces or activities, but even without specific measurements, some efficiencies will be obvious. Are lights on in unoccupied spaces? Does equipment go to “sleep” when not in use? Does the HVAC work “harder” at some times than others?
- Develop an integrated team approach. Energy demand is affected by a range of building features and occupant activities; identify key team representatives for each.

2. Update and Improve

Do the simplest, least expensive projects first. Evaluate more expensive projects, as well as planned purchases and renovations, in terms of **NETZERO** Energy. Will the new/renovation effort reduce energy use? Will it facilitate conversion to renewable energy?

Load reduction - Develop policies and active strategies such as installing (or programming) automatic controls. Examples include occupancy sensors for lighting and process/plug load management.

Passive strategies - Passive strategies rely upon the building itself to manage occupant comfort and reduce energy needs. Examples include shading devices, insulation, natural ventilation, and daylighting.

Efficient systems - As you reduce your energy requirements, your systems (HVAC, lighting) may no longer be optimally sized. They may be designed for a larger load; operating for lesser loads is usually inefficient. Stage improvements accordingly.

Energy recovery - Try techniques like air recirculation and heat exchange.

3. Evaluate Renewable Options

After reducing your energy needs, use zero-emission sources to produce the remaining energy you need to achieve your **NETZERO** targets.

On-Site renewables - Examples include solar (photovoltaic; solar thermal – hot water), and wind power.

Off-sites - These may include a variety of source energies developed through a collective approach like Renewable Energy Certificates (RECs) and energy district partnerships.

4. Continuously Retune

- Reassess your performance and continue to improve.
- Optimize your operations to make the most of what you have.
- Meet regularly with your integrated team and keep talking about performance improvement.
- Build partnerships. Your building may be able to produce more energy than it uses, helping others reach **NETZERO** (e.g., portfolio or partnership – see Implications for Long Range Planning).

Key Characteristics

NETZERO Energy buildings may be uncommon now, but they are increasing in number, size, and complexity. The efficiency levels needed for **NETZERO** Energy buildings are readily obtainable for many common building types with current technology and at reasonable incremental costs. **NETZERO** Energy buildings in operation today share key characteristics, especially the use of

- readily available technology
- an integrated design approach
- careful plug load management
- photovoltaics for on-site renewable energy

Many buildings are **NETZERO** Energy capable and are already so energy efficient they could easily achieve **NETZERO** Energy with the addition of renewable power generation (on-site or off-site).

Implications For Long Range Planning

Under **NETZERO** Energy, energy requirements must be obtained from zero-emission sources. This means that you will need renewable energy generation – either on-site or off-site. So, facility cost /benefit comparisons should consider the eventual expense and potential savings of renewable energy acquisition.

Facility Repairs & Renovations

Repair may solve an immediate problem, but upgrade or replacement may prove the better investment overall. Determining which upgrade or replacement is optimal may be different when evaluating a facility for **NETZERO** Energy. Perhaps one solution is more compatible with – or convertible to – a particular renewable energy system.

Portfolio Management

Incorporate **NETZERO** Energy targets into contracts. Consider Energy Savings Performance Contracts (ESPCs). Assess a building's potential for renewable energy generation in property valuation. Identify and compare inherently efficient building characteristics, opportunities for on-site generation, and availability of renewable energy for purchase or trade.

Partnerships

Not all buildings will be able to generate the energy they need on their own sites. Many will need to explore some sort of creative partnering (e.g., districts, associations). Perhaps one partner has sufficient roof area for significant solar energy generation, and other partners invest in the installation of the photovoltaics.



**KEEP YOUR EYE ON
THE BALL AND
FOLLOW THROUGH!**